CLAIMS

1. (Original) A modular router comprising:

a single electrical backplane rated to distribute at least 5000 Watts of power from a power supply to modules connected to the backplane, the backplane further comprising multiple high-speed serial differential-signaling trace pairs for carrying packet data signaling between modules connected to the backplane, the multiple differential signaling trace pairs capable of supporting, in the aggregate, data signaling across the backplane at a rate of at least 500 Gigabits/second.

2. (Original) The router of claim 1, wherein the backplane is also rated to simultaneously distribute at least 5000 Watts of power from a second power supply to modules connected to the backplane.

3. (Original) The router of claim 2, wherein the backplane comprises a plurality of power planes to distribute power as claimed, a plurality of ground planes, and a plurality of high-speed signaling layers containing the high-speed serial differential-signaling trace pairs, the power planes located near the center of the backplane and isolated from the high-speed signaling layers by ground planes, each high-speed signaling layer isolated from each other high-speed signaling layer by ground planes.

4. (Original) The router of claim 3, wherein the power planes each have a thickness at least three times the thickness of the electrical traces and ground planes.

5. (Original) The router of claim 3, wherein the backplane further comprises at least two low-speed signaling layers, the low-speed signaling layers interposed between the high-speed signaling layers and the power planes.

6. (Original) The router of claim 3, each power plane comprising a conductive guard ring adjacent the edges of the backplane and electrically direct-current isolated from the center conductive area of that power plane.

7. (Original) The router of claim 6, having a chassis ground, wherein each conductive guard ring is connected to chassis ground.

8. (Original) A router comprising:

a first plurality of packet input/output cards, each having a first backplane electrical connector set to receive and transmit packet data signaling, and a second backplane electrical connector set to receive electrical power;

a second plurality of switch fabric cards, each having a first backplane electrical connector set to receive and transmit packet data signaling, and a second backplane electrical connector set to receive electrical power; and

a single electrical backplane having slots capable of mating with the backplane electrical connector sets of the first and second pluralities of cards, the backplane having

multiple high-speed signaling layers, each embedded between a pair of ground planes, the high-speed signaling layers comprising electrical differential trace pairs connecting the slots corresponding to the first backplane electrical connector sets of the first card plurality to the slots corresponding to the first backplane electrical connector sets of the second card plurality, and

at least two power planes embedded between the high-speed signaling layers and isolated from the high-speed signaling layers by ground planes, the power planes connected to the second backplane electrical connector sets of the first and second card pluralities and rated to distribute at least 5000 Watts of power to the card pluralities.

9. (Original) The router of claim 8, wherein the high-speed signaling layer electrical traces, taken together, are capable of supporting packet data signaling across the backplane at a combined rate of at least 500 Gigabits/second.

10. (Original) The router of claim 8, wherein the high-speed signaling layer electrical traces, taken together, are capable of supporting packet data signaling across the backplane at a combined rate of at least 1000 Gigabits/second.

11. (Original) The router of claim 8, wherein the at least two power planes comprise first and second supply planes and first and second return planes all separated by layers of dielectric material, the first and second supply planes adjacent, the first return plane adjacent the first supply plane, and the second return plane adjacent the second supply plane, the router further comprising first and second power supplies coupled to the backplane, the first

power supply electrically connected to the first supply and return planes, the second power supply electrically connected to the second supply and return planes.

12. (Original) The router of claim 11, wherein the power planes each have a thickness at least three times the thickness of the electrical traces and ground planes.

13. (Original) The router of claim 11, wherein the backplane further comprises at least two low-speed signaling layers, the low-speed signaling layers interposed between the high-speed signaling layers and the power planes.

14. (Original) The router of claim 11, wherein the slots for the packet input/output cards are arranged in a first rank on the backplane, the slots for the switch fabric cards are arranged in a second rank on the backplane, and the first and second ranks are spaced apart such that, on the power planes, the space between the first and second ranks can be used as a primary power distribution path.

15. (Original) The router of claim 14, wherein the first power supply couples to the backplane adjacent one end of the second rank of slots, and wherein the second power supply couples to the backplane adjacent the opposite end of the second rank of slots.

16. (Original) The router of claim 8, further comprising a forced air unit capable of enhancing air flow across the packet input/output cards and the switch fabric cards, the forced air unit electrically connected to the backplane at forced air power connectors and receiving power through the power planes.

17. (Original) The router of claim 16, wherein the power planes comprise patterned isolation features adjacent the forced air power connectors, the isolation features increasing the resistance of a power path passing the forced air power connectors.

18. (Original) The router of claim 8, each power plane comprising a conductive guard ring adjacent the edges of the backplane and electrically direct-current isolated from the center conductive area of that power plane.

19. (Original) The router of claim 18, having a chassis ground, wherein each conductive guard ring is connected to chassis ground.

20. (Original) A router comprising:

a first plurality of packet input/output cards, each having a first backplane electrical connector set to receive and transmit packet data signaling, and a second backplane electrical connector set to receive electrical power;

a second plurality of switch fabric cards, each having a first backplane electrical connector set to receive and transmit packet data signaling, and a second backplane electrical connector set to receive electrical power; and

a single electrical backplane having slots capable of mating with the backplane electrical connector sets of the first and second pluralities of cards, the backplane having

multiple high-speed signaling layers, each embedded between a pair of ground planes, the high-speed signaling layers comprising electrical differential trace pairs connecting the slots corresponding to the first backplane electrical connector sets of the first card plurality to the slots corresponding to the first backplane electrical connector sets of the second card plurality, wherein the high-speed signaling layer electrical trace pairs, taken together, are capable of supporting packet data signaling across the backplane at a combined rate of at least 500 Gigabits/second, and

at least two power planes embedded between the high-speed signaling layers and isolated from the high-speed signaling layers by ground planes, the power planes connected to the second backplane electrical connector sets of the first and second card pluralities.